

Compost management in Germany

An overview

Tania Runge

Thünen Institute of Rural Studies

Felicitas Schneider

Thünen Institute of Market Analysis



T. Runge

Outline

1. Some statistical figures and legislation targeting compost
2. The German quality compost system – RAL standard
3. A practice example for the biowaste collection system and some German compost prices
4. Outcomes from innovation projects and other initiatives

Development of biowaste collection and legal background (1)



https://www.umweltbundesamt.de/sites/default/files/medien/384/bilder/dateien/3_abb_bioabfallbehandlungsanlagen_2021-02-17.pdf

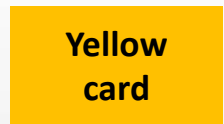
- In 1983 Witzenhausen was the first city with “**biowaste bins**” for households
- 1989 the **Biowaste Ordinance** (BioAbfV) came into force to set conditions for use in agriculture, forestry, gardening and to regulate the hygienisation process, to limit content of pollutants and impurities
- In 2012 **Law on Life-Cycle Management** requiring high-quality recycling of biowaste -> further growth in collection. But last years stagnation and in 2018 decrease due to less plant growth (draught)

Development of biowaste collection and legal background (2)

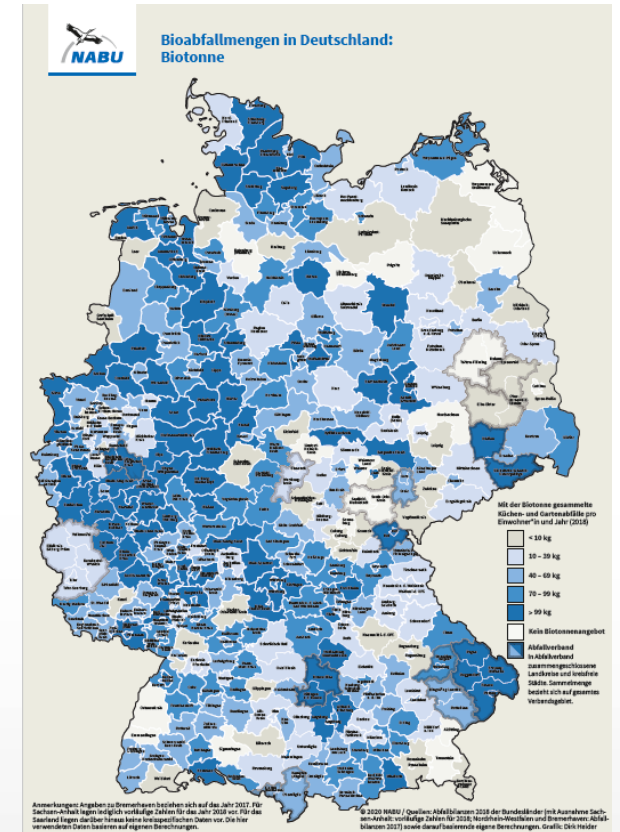
- In 2015 a **separate collection of biowaste** (from households + gardens and parks) became **mandatory**
- Use of biowaste bins or collection in recycling centers
 - full coverage not yet achieved
 - great heterogeneity in the amounts collected
- In 2017 still 39.3 mass % of organic material in household waste, 50 kg/(person*a) (UBA Texte 113/2020)
- 2020 **proposal** for revision of the biowaste law to **better address impurities**, in particular **plastic inputs** (not yet in force)



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= too many impurities



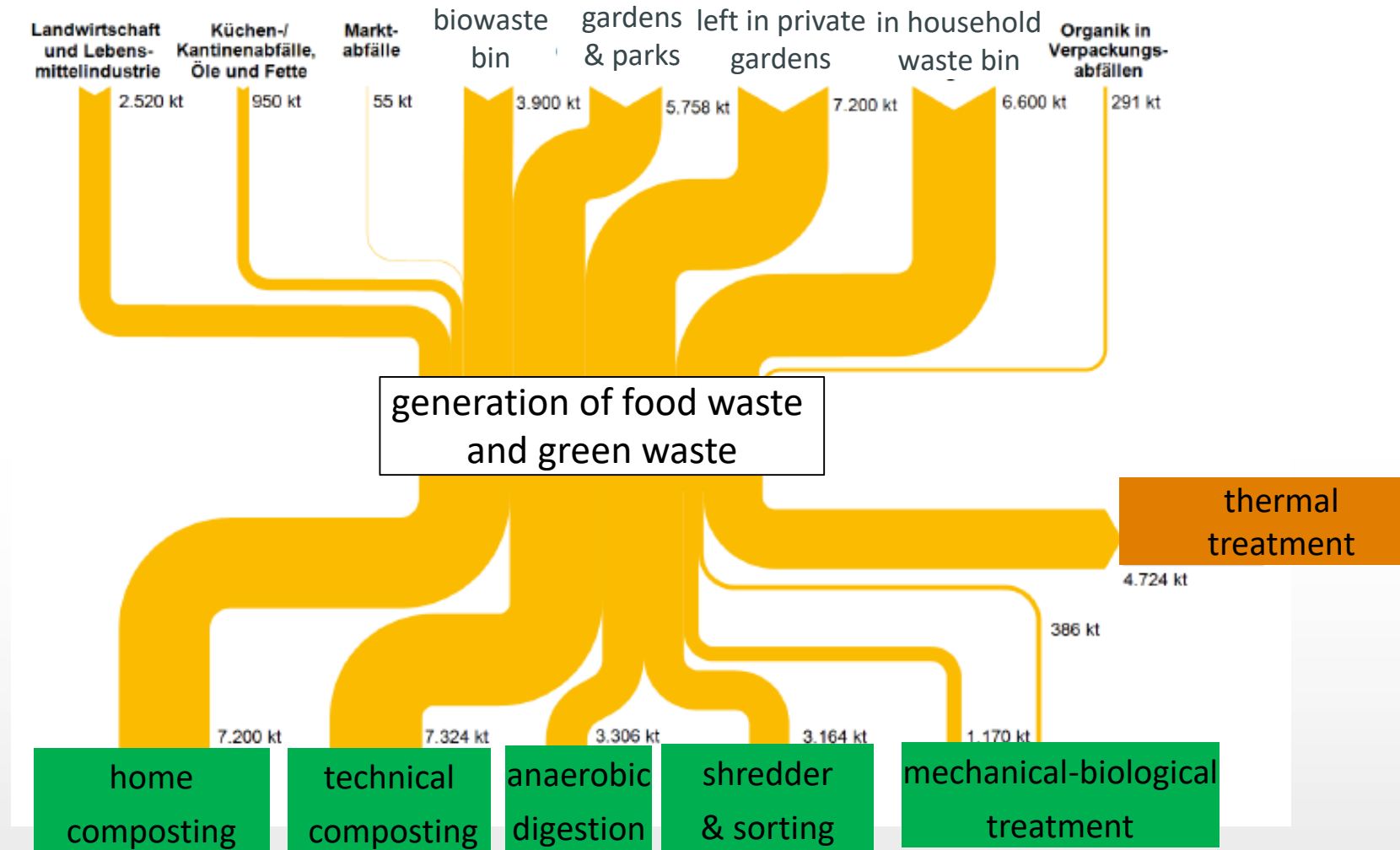
bioabfallmengen_in_deutschland_2020-nabu-karte_2-a4.pdf

on average 59 kg / (person*a) collected via biowaste bin

Development of biowaste collection and legal background (3)

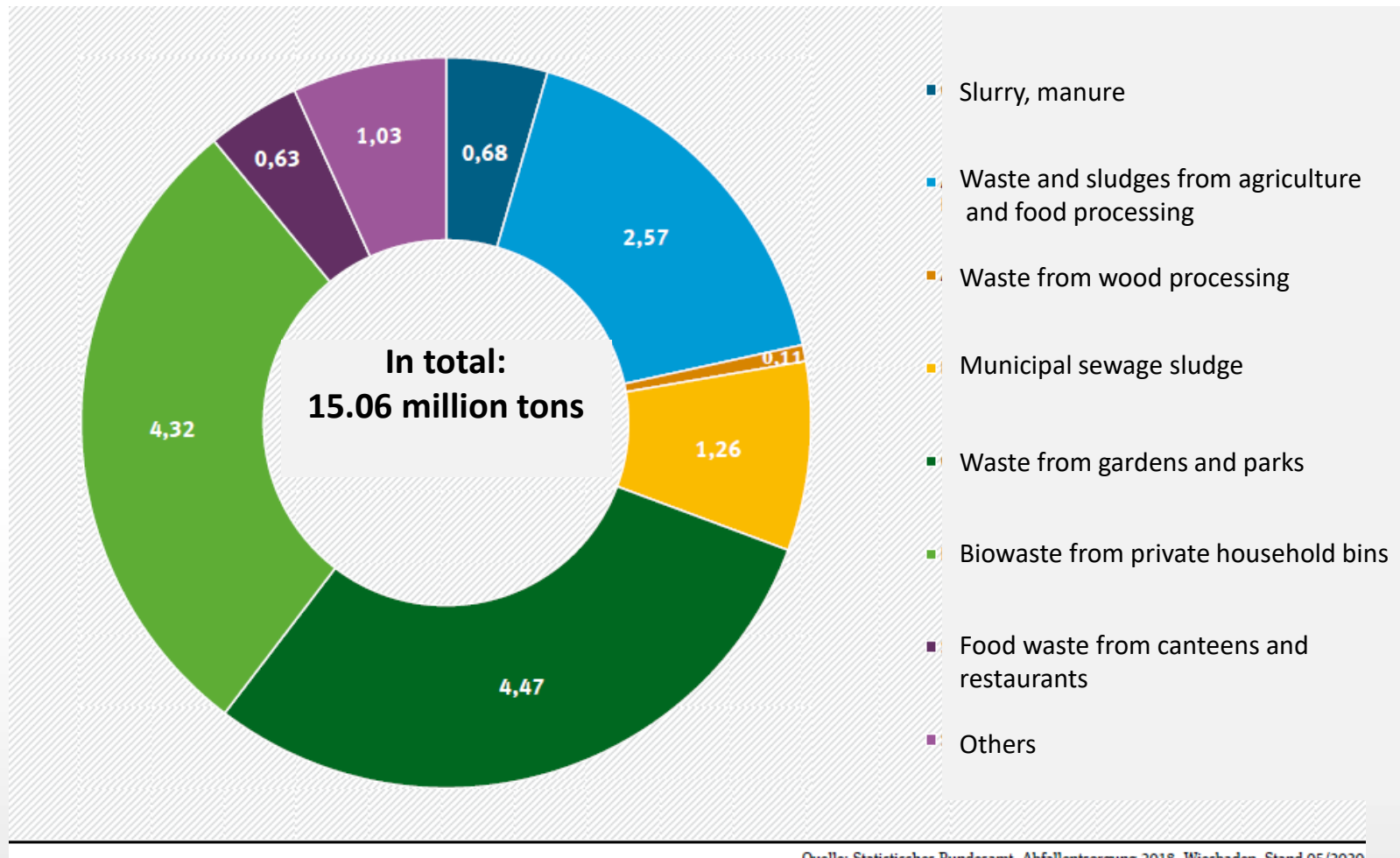
- In 2017 **collection of 125 kg / (person*a) of biowaste in average**
 - 59 kg from private household biowaste bin – 4.5 million tons in total
 - 65 kg from gardens and parks (private + municipal) – 5.4 million tons in total
- In 2017 in total **1 141 facilities for composting and fermentation** were treating biowaste, out of them 213 facilities for biowaste from households, 631 facilities for biowaste from gardens and parks and 297 fermentation facilities (biogas, including combined fermentation and composting)
- **2021: Peat use reduction strategy** (climate legislation)
 - > promotion of compost as alternative
- **EU Fertiliser Products Regulation** likely to affect the compost industry in Germany after the full entry into force on 16.07.2022
 - > CE-requirements for compost alongside with German RAL certification

Collection and treatment of food waste and green waste in Germany 2015



https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2021-01-18_texte_09-2021_verwertung_bioabfaelle.pdf

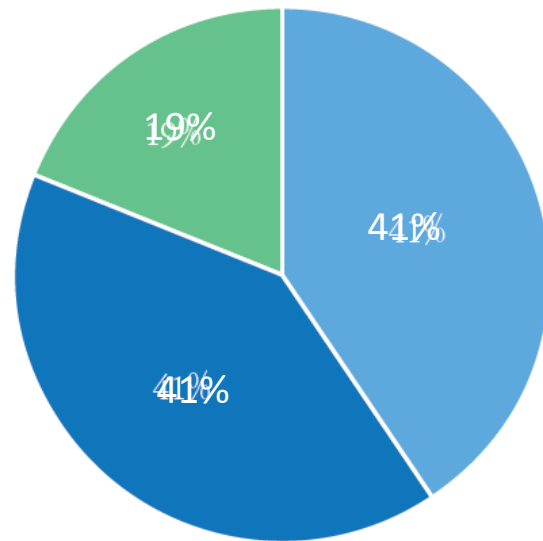
Composition of the biowaste (incl. sewage sludge) delivered to biological treatment facilities - 2018



https://www.umweltbundesamt.de/sites/default/files/medien/384/bilder/dateien/2_abb_zusammensetzung-bioabfaelle_2021-02-17.pdf

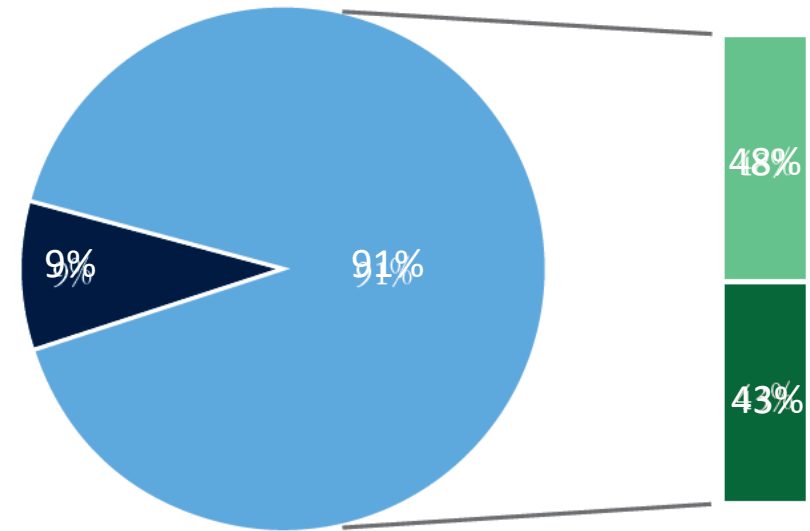
Anaerobic treatment with connected composting in Germany 2014

Process types for biowaste input



- boxing process
- plug flow reactor
- wet fermentation

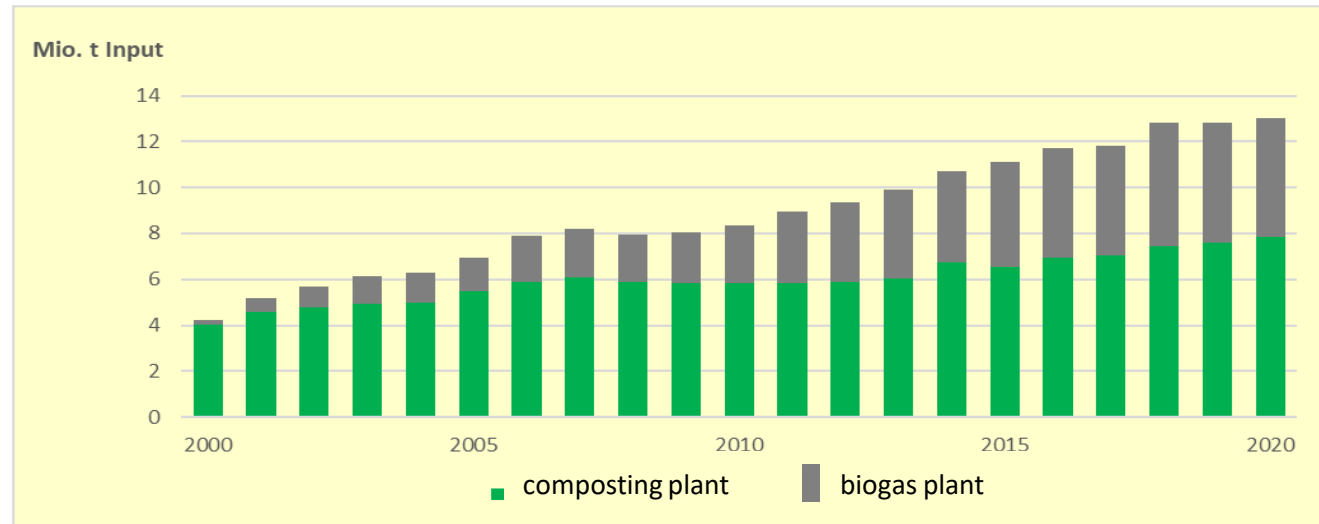
Post-digestion treatment of digestates



- no composting
- downstream composting
- maturing phase
- intensive, curing and maturing phase

https://um.baden-wuerttemberg.de/fileadmin/redaktion/m-um/intern/Dateien/Dokumente/2_Presse_und_Service/Publicationen/Umwelt/2016_Leitfaden_Gaerreste_Bioabfallbehandlung.PDF

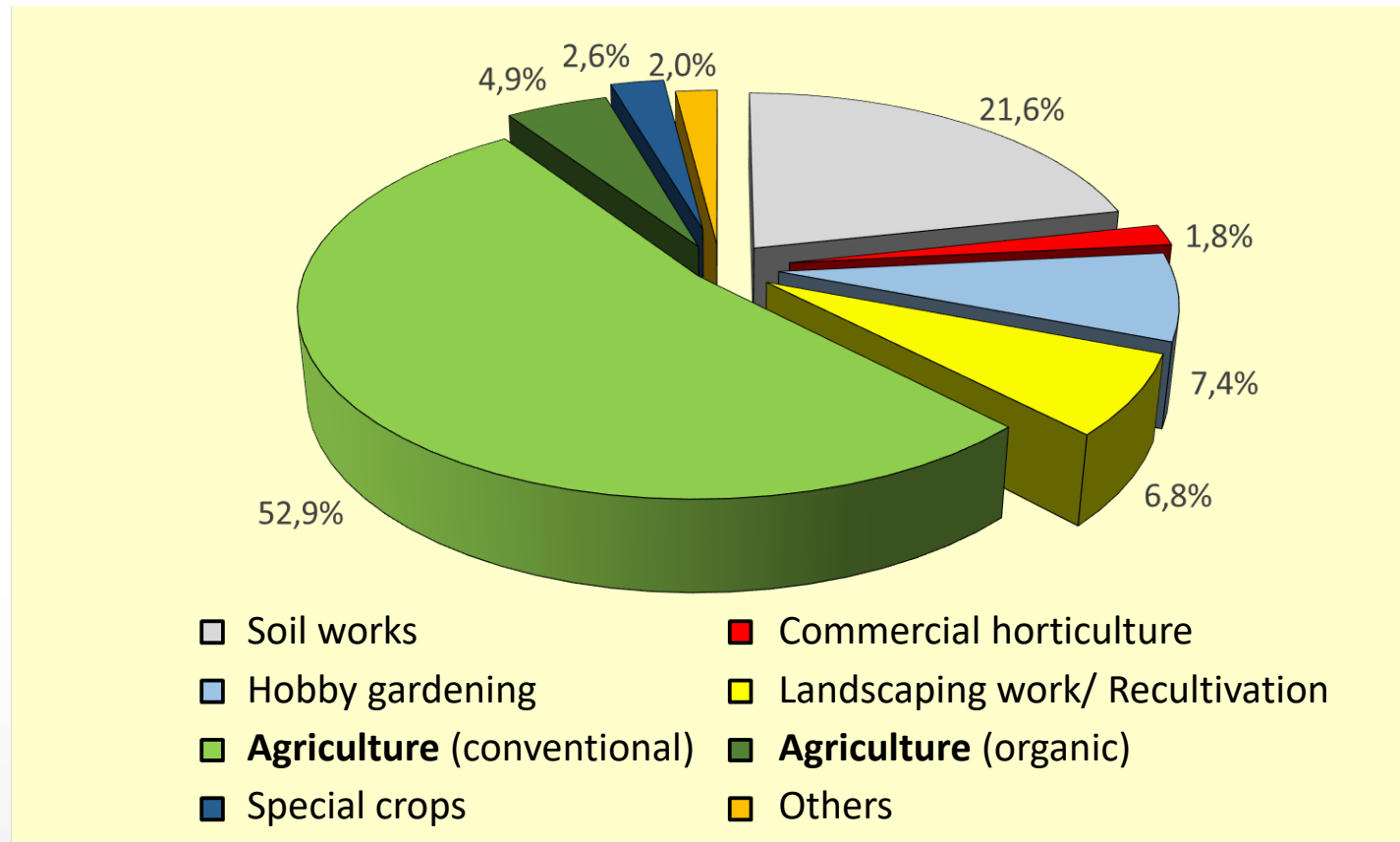
Conversion of input material into quality compost 2000 - 2020



- **13 million tonnes** of organic waste and residues were recycled and processed into **quality-assured composts or fermentation products** in 2020
- **7.8 million tonnes** of input materials were **processed in composting plants** with RAL quality assurance:
 - 50% green waste (mainly from gardens and parks)
 - 49 % biowaste from private household biowaste bins, 1% other biowaste
- Products have to comply with biowaste and fertilizer legislation

https://www.kompost.de/fileadmin/user_upload/Dateien/HUK-Dateien/2021/Q1_2021/Verwertung_von_Bioabfaellen_2020__HUK_Q1_2021.pdf






Sales channels of quality-assured composts in 2020



In organic farming compost from green cuttings as well as biowaste compost with proven suitability is permissible and usable.

https://www.kompost.de/fileadmin/user_upload/Dateien/HUK-Dateien/2021/Q1_2021/Verwertung_von_Bioabfaellen_2020__HUK_Q1_2021.pdf

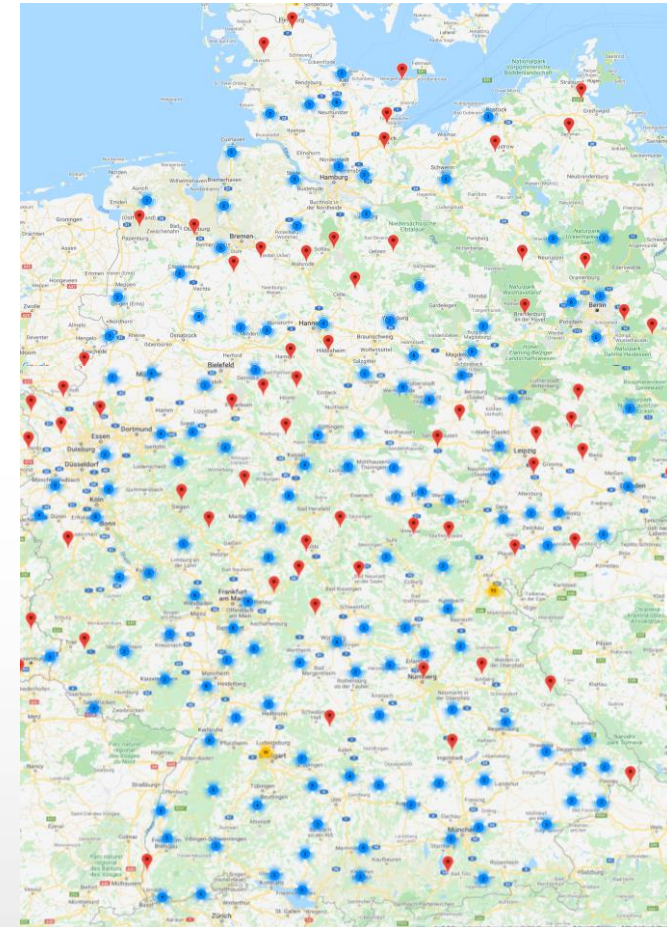
Quality products portfolio made from German biowaste in 2020

Quality standard	Quality label	Number of facilities	Produced products
RAL-GZ 251 Compost		576	Finished (Ready-made) compost Fresh compost Substrate compost
RAL-GZ 245 Fermentation product		137	Fermentation product solid Fermentation product liquid
RAL-GZ 248 Fermentation product from renewable resources		48	Fermentation product from renewable resources solid Fermentation product from renewable resources liquid
RAL-GZ 252 Fertilizer/ Wood ash		14	Wood ash from biomass combustion as fertilizer or as feedstock for fertilizer
RAL-GZ 252 Food recycling		6	Recycling of packaged and unpackaged food waste as feedstock for fertilizer

More product safety through RAL Quality Assurance

- In total production of **7.4 million tons** of compost per year (72 % of the German compost produced from waste from gardens and parks and 83% from other biowaste)
- The RAL Quality Assurance ensures **regular voluntary inspections** by a neutral body (Quality Committee)
- **Documentation** ensuring the compliance with the specified quality standards accessible to product users and consumers
- Extensive **in-house and external monitoring** guarantees compliance with the quality standards
- **Retained samples** and the **declaration of important substrate parameters** additionally increase user safety

Map with the RAL compost facilities



<https://www.kompost.de/service/hersteller/-produkte>

Core quality criteria of finished compost (RAL-GZ 251)

- **Sanitation:** Free from germinable seeds and shootable plant parts, free from pathogens
- **Foreign substances:** < 0.5 % by mass in dry matter
- **Stones:** < 5 weight % in dry matter
- **Water content:** loose material < 45 mass %, bagged material < 35 mass %
- Plant compatibility
- **Rotting degree:** IV or V
- **Organic matter** > 15 mass % in dry matter
- **Heavy metal content:** according to waste and soil protection legislation
- **Declaration:** finished compost, manufacturer, pH-value, salinity, nutrients, organic substance, instructions for proper use, etc.

Biowaste collection from private homes – example of Gifhorn, Lower Saxony

Biowaste bin 120 l: 4.44 EUR per collection

In comparison: Household waste bin 120 l: 6 EUR per collection
(plus 4.43 EUR / month)

Twice a year: collection of prunings (spring and autumn)

In autumn: collection points for leaves (since 2010 for free)



Early January: collection of christmas trees

Some prices for ready-made compost in Germany

Products sold by compost facility in Braunschweig (all RAL certified):

<https://alba-bs.de/service/kompost.html>

- “Braunschweiger” Compost, 0-20 mm
(origin: 50% biowaste bin, 50% green waste garden&park)
on special days for free – combined with awareness rising activities
3 EUR / car boot load
8 EUR/m³
- Green waste compost, 0-20 mm (organic certification)
4.50 EUR / car boot load
12 EUR /m³
- Green waste compost, 0-10 mm (organic certification)
6 EUR / car boot load
14 EUR /m³

Products sold by compost facility in Hamburg:

<https://www.vkn-kompostvermarktung.de/preise-komposterde-hamburg>

- Quality compost
11.90 EUR /m³

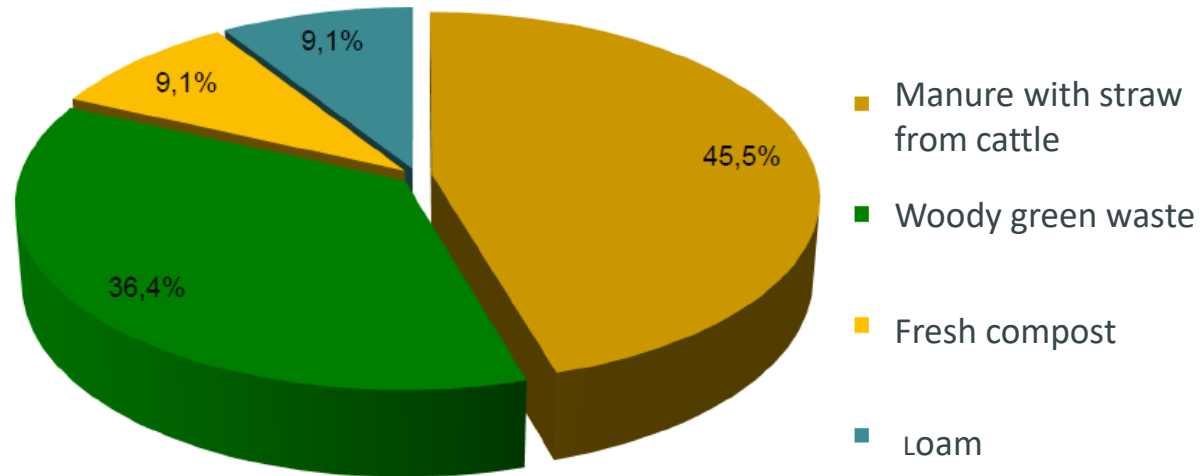
Products sold by compost facility near Berlin:

https://www.ke-nord.de/cms/upload/downloads/KE_Nord_Preisliste_Privat_Verkauf_ab_2021_06_15.pdf

- compost , 0-25 mm from gardens and parks (RAL certification)
17.26 EUR /m³

EIP project: organic potatoes with compost

Composition of the tested compost



- Yield-increasing effects of compost more on light soils and soils poorly supplied with nutrients
- 19 % more gross yield with 30 t/ha "compost + N" than "unfertilised"
- 17 % more marketable yield with 30 t/ha "compost + N" than "unfertilised"
- 21 % more marketable yield with 30 t/ha "fresh compost + N" than "unfertilised"
- No effects on wireworm infestation

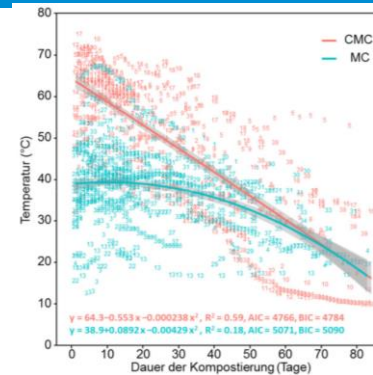
<https://projekte.eip-nds.de/nachhaltige-pflanzenproduktion/einsatz-von-komposten-oekologischer-kartoffelanbau/>

EIP project: Innovation composting for more soil fertility

Assessing practical composting systems, especially for organic farms for higher yields and provision of humic substances for the soil. Participation of 18 farms in Schleswig-Holstein

Comparison of two methods:

Controlled Microbial Composting (CMC) and Microbial carbonisation (MC). In MC no turning of the biomass for repeated aeration during composting process, at least 12 weeks -> lower workload, but in MC less homogeneous and more rotten material visible



Trials with compost itself and compost teas (2016-2018 trial years):

- Practical trials with various crops showed that fertilisation with finished compost (8-10 t/ha) had positive tendency up to significant increase in yield (compared to other fertilisers)
- In 2018 (year with drought) significantly higher yields were possible with compost, but also with tea application

<https://www.eip-agrar-sh.de/eip-innovationsprojekte/1-call/innovation-kompostsysteme-bodenfruchtbarkeit>

https://www.landwirtschaft.sachsen.de/download/04_Holle_Mikrobielle_Carbonisierung_als_Kompostiermethode.pdf

Projects supporting the peat use reduction strategy

- **Starting point:** Climate Protection Programme 2030 -> German government has committed to reduce the use of peat as a growing medium and soil conditioner as far as possible, focus on voluntary initiatives
- A 20 % by volume **replacement of peat in potting soils** with ready-made composts would require 615 000 m³ of suitable compost
- **TerZ - Peat substitute in ornamental horticulture (2019-2022)**
-> trials in commercial ornamental horticulture
with 10 vol. % compost instead of peat (max. 50% peat)
- **ToSBa - Peat reduction in nursery substrates (2020-2024)**
-> trials in commercial tree nurseries with substrates
containing less than 50 % peat, incl. green waste compost use
- **Database** with peat-free soils and peat substitutes
<https://www.torffrei.info/marktuebersicht-torf-alternativen>



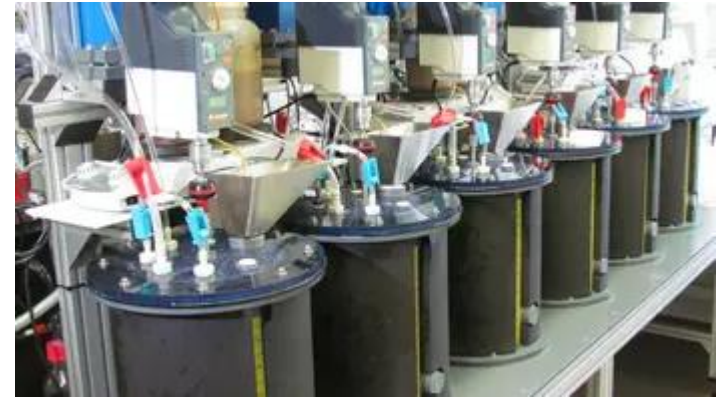
<https://projekt-terz.de/>



<https://www.lwk-niedersachsen.de/index.cfm/port al/gartenbau/nav/2420.html>

MethaKomp project: Compost as a booster for biogas plants

- The **adding of compost extracts** from farms to biogas plants showed an **increase in the degradation** of grass silage by up to 22 %, furthermore an **acceleration of methane formation** by an average of 13 %



- When **applying stable mixed cultures** through enriching the compost materials and bacteria groups in the laboratory, those compost cultures **even led to higher biogas yields** than could be calculated theoretically, which indicates a partial **degradation of the lignin by the microorganisms of the compost cultures**
- Considered as a simple option for **increasing the efficiency of biogas plants** by the scientists

<https://www.fnr-server.de/ftp/pdf/berichte/22413612.pdf>

LaubCycle project: Using leaves as a source of energy

- Up to **740 000 tons of leaves** from streets and public areas in German municipalities
- Seasonal delivery and slow rotting as challenge for the composting plants
- The leaves should become a source of energy and nutrients by **burning in biomass power plants** that generate electricity and heat from it
- A research institute, the city of Schortens and the biomass processing company will perform:
 - analyses of the leaves and the resulting ashes
 - studies on processing in a practice combustion plant
 - studies on the influence of leaf quality on emissions



<https://www.wissenschaftsjahr.de/2020-21/aktuelles/august-2021/laub-als-energiequelle-nutzen>

Contacts:

tania.runge@thuenen.de

felicitas.schneider@thuenen.de

www.thuenen.de



T. Runge



https://alba-bs.de/fileadmin/user_upload/header/header_kompost.jpg



<https://www.neue-braunschweiger.de/alba-verschenkt-kompost-an-hobbygaertner/>